A rack which has a central portion first and second uprights interconnected by at least one cross member with a hinge pivotally connecting at least one of the first and second uprights to at least one wing portion having a third upright. A fixture is disposed on one of the uprights. The fixture has a longitudinally extending male end and a female end opposite thereto with a first shaft dimensioned to fit within the female end of the fixture, and a second shaft with a sleeve extending therefrom dimensioned to slidably engage the longitudinally extending male end forming with the first shaft one of the uprights pivotally connected to another one of the uprights.
Screwless Metal Hinge and Rack

Field of the Invention

This invention relates generally to the field of storage and hinges, particularly useful in the home, such as in bathrooms and storage closets, but not necessarily limited thereto.

Background of the Invention

The present invention also relates to a rack system including a plurality of uprights forming a central portion of the rack and one or more wing portions with shelves disposed in vertically separated positions along the longitudinal extent of the rack.

The most preferred form of the rack and storage system of the present invention includes a particular hinge element that requires no fasteners or the like and is easy to assemble and disassemble as required.

There are many such devices found in the prior art which relate to a wide variety of fields including foldable close lines, displays and storage systems, collapsible supports for plant containers, various cabinets and drying racks among others. A more complete list of items in which racks and hinges of the type useful hereon are found in the enclosed Information Disclosure Statement, PTO FORM 1449; however, none of the prior art shows or suggest a screwless hinge, rack and storage trays of the type hereinafter set forth.

Summary of the Invention

Accordingly, an object of the present invention is to provide an easily assembled and disassembled storage rack with hinges that contain no screws or other screw-type fasteners and which may hold a significant amount of miscellaneous items.

Another object of the present invention is to provide a hinge pivotally connecting two uprights, comprising a first upright having a fixture disposed thereon, the fixture having a longitudinally extending male end and a female end opposite thereto, a first shaft dimensioned to fit within the female end of the fixture, and a second shaft having a sleeve extending therefrom dimensioned to slidably engage the longitudinally extending male end forming with the first shaft a second upright parallel to the first upright and pivotally connected thereto.

A further object of the present invention is to provide a hinge pivotally connecting two uprights, comprising a first upright having a fixture disposed thereon, the fixture having a longitudinally extending male end and a female end opposite thereto, a first shaft dimensioned to fit within the female end of the fixture, and a second shaft having a sleeve slidably positioned thereon and movable to extend over the longitudinally extending male end forming with the first shaft a second upright parallel to the first upright and pivotally connected thereto, and a deformable member intermediate the distal ends of the longitudinally extending male end and the second shaft frictionally to engage the sleeve.

A final object of the invention is to provide a rack, comprising a central portion first and second uprights interconnected by at least one cross member, a hinge pivotally connecting at least one of the first and second uprights to at least one wing portion having a third upright, a fixture disposed on one of the uprights, the fixture having a longitudinally extending male end and a female end opposite thereto, a first shaft dimensioned to fit within the female end of the fixture, and a second shaft having a sleeve extending therefrom dimensioned to slidably engage the longitudinally extending male end forming with the first shaft one of the uprights pivotally connected to another one of the uprights.

Brief Description of the Drawings

For the purpose of facilitating an understanding of the invention, there is illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, the invention, its construction and operation, and many of its advantages should be readily understood and appreciated.

Fig. 1 is an assembled rack with the inventive hinge of the present invention; Fig. 2 is an exploded view of the hinge showing one embodiment of the present invention; Fig. 3 is a view of the hinge illustrated in Fig. 4 in its assembled position; Fig. 4 is an exploded view of another embodiment of the hinge of the present invention; Fig. 5 is a view of the hinge illustrated in Fig. 4 in an intermediate position; and Fig. 6 is a view of the embodiment illustrated in Figs. 4 and 5 in a fully assembled position; and Fig. 7 is a constructed rack with a tray.

Detailed Description of the Invention

Referring now to the drawings, there is disclosed in Figs. 1 and 7 a rack 10 which includes a central portion 11 and two wing portions 12. The central portion 11 is constructed of parallel uprights 15 and 16 interconnected by a top cross bar 17, a bottom cross bar 18 which is formed into a foot portion 19 and one or more intermediate crossbars 21. The central portion 11 may be made of a single piece of material formed into the construction illustrated or be made of several pieces welded or otherwise fixed together, such as by gluing if the central portion is made by plastic. Ultrasonic welding or any other form of fixing material together known in the art is included in the invention.

The wing portion 12 is constructed of parallel uprights 25 and 26 interconnected by a top cross bar 27 and a bottom cross parallel 28 which includes a foot portion 29 and one or more intermediate cross bars 31. Again, for the wing portions 12, two are shown but more than two may be included in the invention depending on the ultimate use, and may be constructed of metal such as aluminum or steel or a plastic such as poly carbonate, polyvinylchloride, or any suitable structural plastic material such as polystyrene, ABS, polypropylene, an acrylic or other materials well known in the art. The uprights and cross bars are connected by suitable mechanism or procedures also well known in the art which
include gluing or ultrasonic welding if the material is plastic or welding or any other suitable means if the material is metal.

Either of the uprights 15 or 25 may be made using a fixture 35 which is a portion of a hinge as will be explained. In FIG. 1 of the drawings, it is illustrated that the fixture 35 is mounted to the upright 25 of the wing member, whereas in FIG. 7 the opposite is illustrated. Each fixture 35, as seen in FIG. 2, has a body portion 36 which preferably is cylindrical as are the uprights 15, 25 and 26 but not necessarily. The body portion 36 has a male end 37 and a female end 38 into which can fit a shaft 42. A shaft 41 has a sleeve 40 slidably positioned thereon which is constructed and arranged to fit over the male end 37 of the fixture 35 to provide when combined, an upright 15 as seen in FIGS. 2 and 3.

Referring now to FIGS. 4, 5 and 6, there is an alternate embodiment of the present invention in which like parts are numbered with like numbers and includes uprights 15 or 25 to which it is connected a fixture 35 again having a female end 38 and a male end 37 both of which are formed integrally with the body portion 36. A shaft 42 is inserted into the female end and a shaft 41 is provided with a sleeve 40 which slidably engages both the shaft 41 and the male end 37 so as when combined with the shaft 42 provides an upright as hereinbefore described.

The embodiment in FIGS. 4, 5 and 6 include a deformable member 45 which may be made of any suitable material similar to the materials previously described and includes a cylindrical body portion 46 having two opposed end caps 47 and a skirt or strip portion 48 which frictionally engages the interior of the sleeve 40 when the parts are configured as shown in FIG. 6.

Finally, FIG. 7 shows an assembled construction of the rack 10 in which a tray 50 is positioned thereon. It is understood that a plurality of trays 50 can be included in the rack 10 depending on the number of cross bars 17, 18 and 21 in the construction. In the event that additional central portions 11 or wings portions 12 are desired, additional trays 50 may be included in the rack 10 of the present invention.

As seen therefore, there has been provided a rack 10 which is constructed with a screwless or fastenerless hinge member which includes the aforesaid fixture 35 and the cooperating sleeve 40. The fixture 35 may be provided with an intermediate deformable member 45 to ensure that the hinge remains in the position illustrated in FIG. 6 or in the constructed position as illustrated in FIGS. 1, 3 and 7. The entire construction is easy to fabricate; easy to assemble and disassemble and if made of the appropriate materials, lightweight and sufficiently sturdy to accommodate various articles positioned on the trays 50.

While there has been disclosed what is considered to be the preferred embodiment of the present invention, it is understood that various changes in the details may be made without departing from the spirit, or sacrificing any of the advantages of the present invention.

What is claimed is:

1. A hinge pivotally connecting two uprights, comprising a first upright having a fixture disposed thereon, said fixture having a longitudinally extending male end and a female end opposite thereto, a first shaft dimensioned to fit within the female end of said fixture, and a second shaft having a sleeve extending therefrom dimensioned to slidably engage said longitudinally extending male end forming with said first shaft a second upright parallel to said first upright and pivotally connected thereto.

2. The hinge of claim 1, wherein said fixture is fixedly mounted to said first upright.

3. The hinge of claim 2, wherein said first and second uprights are circular in transverse cross-section.

4. The hinge of claim 3, wherein said female end has an outer diameter substantially equal to the outer diameter of said second upright.

5. A hinge pivotally connecting two uprights, comprising a first upright having a fixture disposed thereon, said fixture having a longitudinally extending male end and a female end opposite thereto, a first shaft dimensioned to fit within the female end of said fixture, and a second shaft having a sleeve extending therefrom dimensioned to slidably engage said longitudinally extending male end forming with said first shaft a second upright parallel to said first upright and pivotally connected thereto, and a deformable member intermediate the distal ends of said longitudinally extending male end and said second shaft frictionally to engage said sleeve.

6. The hinge of claim 5, wherein said fixture is fixedly mounted to said first upright.

7. The hinge of claim 6, wherein said first and second uprights are circular in transverse cross-section.

8. The hinge of claim 7, wherein said female end has an outer diameter substantially equal to the outer diameter of said second upright.

9. The hinge of claim 5, wherein said deformable member is a synthetic organic resin.

10. The hinge of claim 9, wherein said deformable member is generally cylindrical and has an outwardly extending portion thereof in contact with the interior of said sleeve.

11. The hinge of claim 10, wherein said outwardly extending portion is a skirt or a plurality of strips.

12. The hinge of claim 5, wherein said sleeve is generally circular in transverse cross-section.

13. A rack, comprising a central portion first and second uprights interconnected by at least one cross member, a hinge pivotally connecting at least one of said first and second uprights to at least one wing portion having a third upright, a fixture disposed on one of said uprights, said fixture having a longitudinally extending male end and a female end opposite thereto, a first shaft dimensioned to fit within said female end of said fixture, and a second shaft having a sleeve extending therefrom dimensioned to slidably engage said longitudinally extending male end forming with said first shaft one of said uprights pivotally connected to another one of said uprights.

14. The rack of claim 13, and further including a deformable member intermediate the distal ends of said longitudinally extending male end and said second shaft frictionally to engage said sleeve.

15. The rack of claim 14, wherein said uprights are circular in transverse cross-section.
16. The rack of claim 15, wherein said female end has an outer diameter substantially equal to the outer diameter of said second upright.

17. The rack of claim 13, wherein said deformable member is a synthetic organic resin.

18. The rack of claim 17, wherein said deformable member is generally cylindrical and has an outwardly extending portion thereof in contact with the interior of said sleeve.

19. The rack of claim 18, wherein said outwardly extending portion is a skirt or a plurality of strips.

20. The rack of claim 15, wherein said sleeve is generally circular in transverse cross-section.

21. The rack of claim 20, wherein there are two wing portions.

22. The rack of claim 13, and further including at least one shelf supported by said rack.